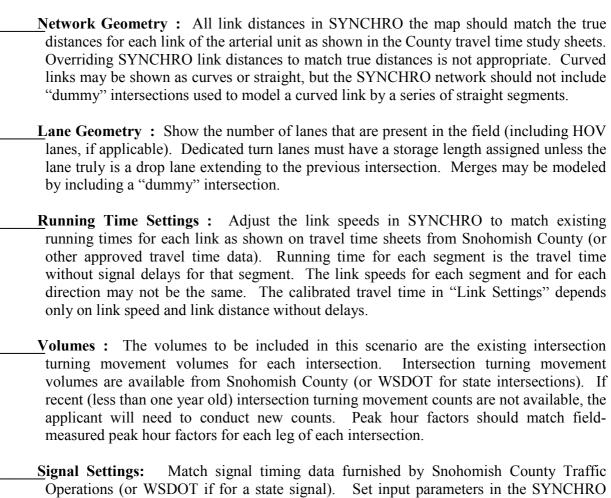
TRAFFIC STUDY FUTURE LEVEL OF SERVICE ANALYSES

SYNCHRO MODEL CALIBRATION

The following is a checklist to be used by consultants in the preparation of SYNCHRO models submitted to Snohomish County for the purpose of documenting a development's future level of service impacts. A future level of service analysis is required for any critical arterial unit impacted by three or more directional peak hour trips from a development generating 50 or more peak hour trips. Your future level of service analysis will generally consist of three scenarios: existing conditions, baseline (with pipeline) conditions, and future (with development) conditions. Scenarios depicting the impacts of proposed mitigation measures or recommended changes to the existing conditions should be included only when necessary and then in addition to the three basis scenarios described.

Scenario #1: Existing Conditions



Operations (or WSDOT if for a state signal). Set input parameters in the SYNCHRO model to match timing sheets with special attention given to phasing – permissive, protected, protected-permissive, or split – and lead/lag. Match green, yellow and red times and pedestrian timing. Time of day functions such as Max II settings and

coordination plans as well as other signal parameters should be adhered to. The following are some guidelines for interpreting the signal timing sheets:

- 1. For actuated uncoordinated signals, check the time of day functions to determine whether the signal operates at MaxI or Max II for a given peak hour.
- 2. Minimum initial in SYNCHRO is minimum green in signal timing sheets.
- 3. Vehicle extension in SYNCHRO is passage in State signal timing sheets.
- 4. Based on HCM 2000, total lost time in SYNCHRO is sum of yellow plus all red times. (This may be adjusted for calibration purposes.)
- 5. Time before reduce = 10 X (maximum gap-vehicle extension).
- 6. Time to reduce = 10 X (vehicle extension-minimum gap).
- 7. For an uncoordinated signal, the Max I or Max II times that show in signal timing sheets are maximum green time only. Maximum splits in SYNCHRO are the sum of maximum green plus yellow plus all red.
- 8. For coordinated signal networks, check to see which coordination plan is in effect for each peak hour. The maximum split for each phase is determined from the force-offs for the appropriate timing plan. Network offsets may be optimized.
- 9. When optimization is necessary and coordination is involved in the analysis, it should be noted that the SYNCHRO default setting for the sync point is the beginning of mainline green. For Snohomish County traffic signals, the sync point should occur at the end of green/beginning of yellow for coordinated phases. Sync points are settable in the "Timing Window".

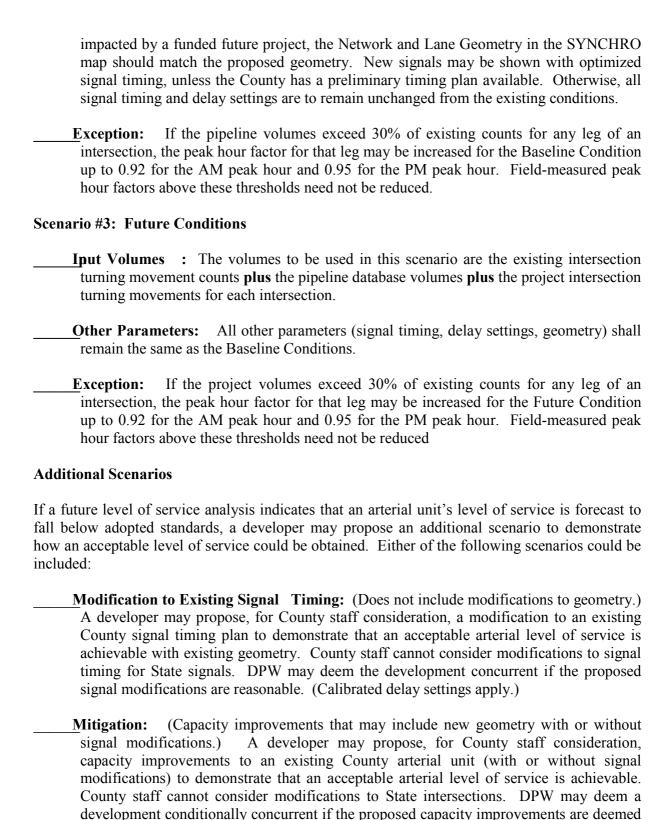
Calibration of Delay Settings: In order to modify SYNCHRO to match existing field-measured signal delay, default values can be adjusted for factors used in the SYNCHRO percentile delay method. The first factors to be adjusted are total lost time and saturation flow rate. Other settings that can be adjusted include lane utilization factor, turning factors, width, grade, area type, busses and parking. Note that the overridden values will show in "red", and these factors will apply for baseline and future conditions.

Check: "Travel Time" in "Link Settings" will be the "Running Time" in the SYNCHRO report. "Travel Time" in SYNCHRO report is a total of "Running Time" and "Signal Delay". Check to see that the overall travel time in SYNCHRO report matches the travel time measured in the field. Calibrated model shall <u>not</u> exceed actual travel speed by more than **1.0** mph.

Scenario #2: Baseline Conditions

Input Volumes:	The volumes	to be	used in this	scenario	are th	e existi	ng ir	ntersec	ction
turning movemen	nt counts plus	the p	oipeline data	abase vol	umes	for eac	h in	tersec	tion
Pipeline volumes	are available	from	Snohomish	County,	and n	nust be	no o	older	than
allowed by DPW	rules.			•					

Update Network: Check the Six-Year Network to see if any impacted arterial units are to be impacted by **funded** future projects. (Developer-proposed modifications to the system should be included as a "Mitigation" scenario.) If the arterial unit will be



capacity improvements. (Delay settings may be set to default values.)

to provide the acceptable level of service, and the developer offers to construct the